

## CLAIMS

1. A gas turbine engine exhaust nozzle comprising:
  - an inner duct having a main outlet at an aft end thereof, and including a row of radial apertures spaced upstream from said outlet;
  - an outer duct having a row of intakes at a forward end thereof, an auxiliary outlet at an end thereof, and surrounding said inner duct over said apertures to form a bypass channel terminating at said auxiliary outlet; and
  - a plurality of flaps hinged at upstream ends thereof to selectively cover and uncover corresponding ones of said apertures and selectively bypass a portion of exhaust flow from said inner duct through said outer duct in confluent streams from both said main and auxiliary outlets.
2. A nozzle according to claim 1 further comprising:
  - a radial frame extending circumferentially between said outer and inner ducts forward of said apertures; and
  - a plurality of longitudinal frames extending axially from said radial frame and disposed circumferentially between corresponding ones of said apertures.
3. A nozzle according to claim 2 wherein said intakes are aligned with corresponding ones of said flaps, and are blocked thereby when said flaps uncover said apertures.
4. A nozzle according to claim 3 wherein said intakes are flush in an outer skin of said outer duct.
5. A nozzle according to claim 4 wherein said intakes comprise troughs inclined inwardly toward said bypass channel.
6. A nozzle according to claim 5 wherein said trough intakes terminate upstream from said auxiliary outlet for engaging said flaps when open.

7. A nozzle according to claim 6 wherein said intakes are triangular, and include an upstream facing apex and downstream facing base.
8. A nozzle according to claim 4 wherein said outer and inner ducts converge aft toward said outlets thereof to provide concentric and confluent exhaust flow discharge when said flaps are open.
9. A nozzle according to claim 8 wherein said bypass channel converges aft to said auxiliary outlet.
10. A nozzle according to claim 4 wherein said auxiliary outlet is axially spaced upstream from said main outlet in parallel planes.
11. A nozzle according to claim 4 further comprising two of said intakes disposed upstream of each of said flaps.
12. A nozzle according to claim 4 further comprising means for closing said flaps atop said apertures for blocking flow therethrough.
13. A nozzle according to claim 4 further comprising means for permitting said flaps to open and uncover said apertures under differential pressure between said inner and outer ducts.
14. A nozzle according to claim 4 further comprising a plurality of spring actuators mounted between corresponding ones of said flaps and said radial frame for biasing closed said flaps atop said apertures.
15. A nozzle according to claim 14 wherein said actuators are sized for permitting said flaps to open and uncover said apertures under differential pressure between said inner and

outer ducts.

16. A nozzle according to claim 15 wherein said actuators are passive devices without external power.

17. A nozzle according to claim 14 wherein each of said actuators includes an output rod joined to a corresponding flap by a sliding link.

18. A nozzle according to claim 4 further comprising a thrust reverser disposed upstream of said radial frame.

19. A nozzle according to claim 18 wherein said thrust reverser includes:  
a plurality of doors covering corresponding side openings; and  
means for selectively opening said doors to uncover said side openings for reversing thrust from said exhaust flow.

20. A nozzle according to claim 19 wherein said thrust reverser further comprises:  
a forward barrel and an aft barrel defining said inner duct integrally joined together by lateral beams defining said side openings therebetween; and  
said outer duct forms a smooth outer mold line with said forward barrel and doors when stowed closed.

21. A nozzle according to claim 4 wherein said auxiliary outlet is an annulus at least in part around said inner duct.

22. A nozzle according to claim 4 wherein said auxiliary outlet comprises a pattern of apertures in said outer skin.

23. A gas turbine engine exhaust nozzle comprising:  
an inner duct having a main outlet at an aft end thereof, and including a row of radial

apertures spaced upstream from said outlet;

an outer duct having a row of triangular intakes at a forward end thereof, an auxiliary outlet at an end thereof, and surrounding said inner duct over said apertures to form a bypass channel terminating at said auxiliary outlet;

a plurality of flaps hinged at upstream ends thereof to selectively cover and uncover corresponding ones of said apertures and selectively bypass a portion of exhaust flow from said inner duct through said outer duct in confluent streams from both said main and auxiliary outlets; and

wherein said intakes are aligned with corresponding ones of said flaps, and are blocked thereby when said flaps uncover said apertures.

24. A nozzle according to claim 23 further comprising means for selectively opening said flaps to block said intakes and unblock flow from said apertures, through said bypass channel, and out said auxiliary outlet, and in reverse closing said flaps atop said apertures to block flow therefrom while unblocking flow from said intakes, through said bypass channel, and out said auxiliary outlet.

25. A nozzle according to claim 24 wherein said intakes are flush in an outer skin of said outer duct.

26. A nozzle according to claim 25 wherein said auxiliary outlet is spaced upstream from said main outlet.

27. A nozzle according to claim 26 further comprising:  
a radial frame extending circumferentially between said outer and inner ducts forward of said apertures; and

a plurality of longitudinal frames extending axially from said radial frame and disposed circumferentially between corresponding ones of said apertures.

28. A nozzle according to claim 27 wherein said intakes comprise troughs inclined

inwardly toward said bypass channel.

29. A nozzle according to claim 28 further comprising two of said intakes disposed upstream of each of said flaps.

30. A nozzle according to claim 29 wherein said means are passive for permitting said flaps to open and uncover said apertures under differential pressure between said inner and outer ducts.